

The TQ9114 IF/AGC (Intermediate Frequency/Automatic Gain Control) Amplifier is part of TriQuint's RFIC Downconverter Building Block family. Intended for use as an Automatic Gain Control Amplifier in an IF stage, a wide range of gain control is available. The TQ9114 provides wide-bandwidth operation from a standard +5 V power supply. Its low current consumption and small, plastic surface-mount package are ideally suited for low-cost hand-held and battery-powered applications.

### Electrical Specifications

**Test Conditions:**  $V_{DD} = +5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ , Frequency = 100 MHz

Parameter <sup>(1)</sup>	Min.	Typ.	Max.	Units
Frequency of operation	30		500	MHz
Gain MHz	27	30		dB
AGC Range <sup>(2)</sup>	50	60		dB
DC Supply Current		3.1	4.5	mA
Gain Control Voltage	0		5	V

Note: 1. Min/Max values listed are production tested.  
 2.  $V_{AGC} = 0\text{ V}$ , Max. Gain;  $V_{AGC} = +5\text{ V}$ , Min. Gain  
 3. Voltages which produce Min. and Max. Gain

## TQ9114

### IF/AGC Amplifier

#### Features

- 30 – 500 MHz operation
- 30 dB gain @ 100 MHz
- 60 dB AGC range
- Single + 5 V supply
- 3.1 mA supply current
- SO-8 plastic package

#### Applications

- GPS (Global Positioning Systems)
- Cellular Communications
- Spread-Spectrum Receivers

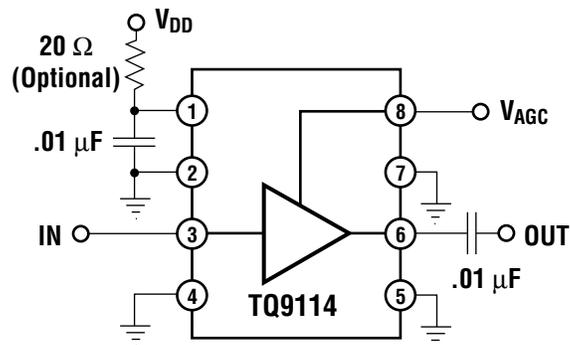
# TQ9114

## Electrical Specifications

**Test Conditions:**  $V_{DD} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ , Frequency = 100 MHz

Parameters	Condition	Min.	Typ.	Max.	Units
Frequency of Operation		30		500	MHz
Gain	Freq. = 100 MHz	27	30		dB
Gain	Freq. = 500 MHz	17	21		dB
Gain Control Range	Max. gain = 30 dB		60		dB
Noise Figure	50 $\Omega$ System		6.0		dB
Output 3rd Order Intercept			-5		dBm
Output 1dB Compression			-15		dBm
Gain Control Voltage		0		5	V
Supply Current			3.1	4.5	mA
Supply Voltage		4.5	5.0	5.5	V

## Test Circuit



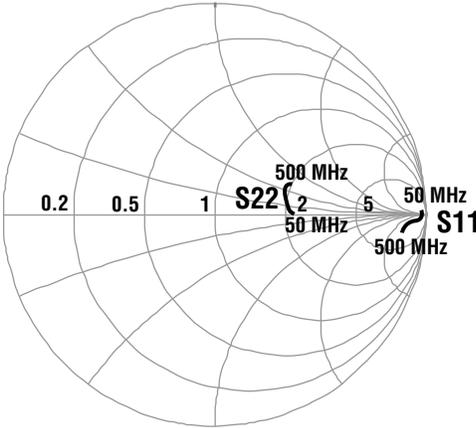
**S-Parameters (typical)**

Test Conditions:  $V_{DD} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ ,  $V_{AGC} = 0\text{ V}$

Freq (MHz)	S11	$\angle S11$	S21	$\angle S21$	S12	$\angle S12$	S22	$\angle S22$	Gain (dB)
50	0.972	-1	38.3	19	0.0006	-90	0.356	4	31.7
100	0.968	0	35.6	-17	0.0008	157	0.365	4	31.0
200	0.971	-1	29.2	-53	0.0004	103	0.358	7	29.3
300	0.973	-2	27.7	-78	0.0004	48	0.358	13	27.1
400	0.947	-1	17.2	-96	0.0007	83	0.371	18	24.7
500	0.931	-3	13.1	-110	0.0012	105	0.387	20	22.4

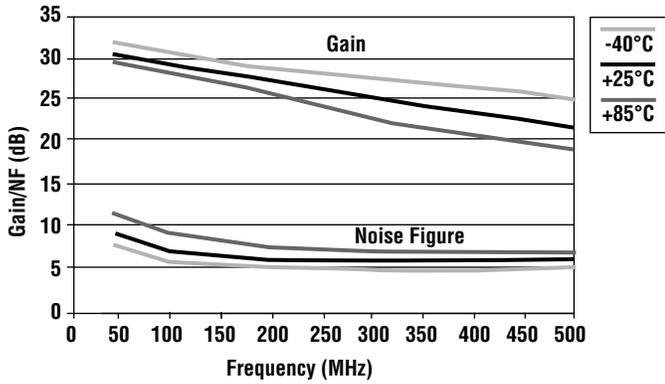
ICs

**Input and Output Impedance**

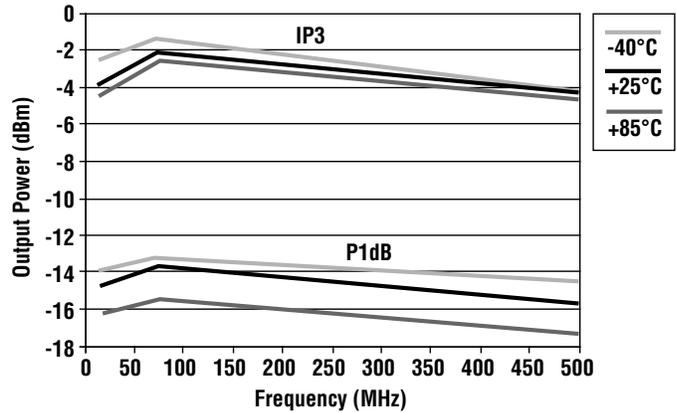


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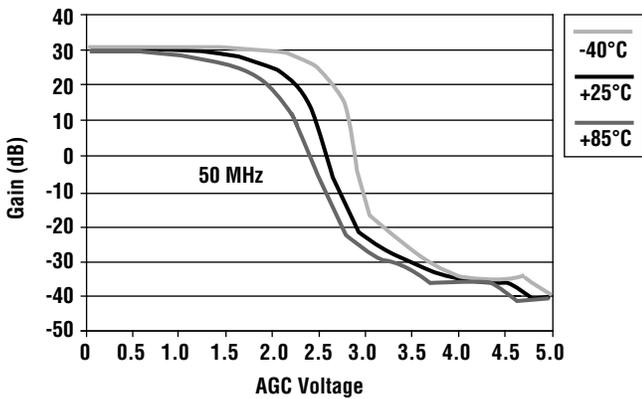
**Gain / NF vs. Frequency vs. Temperature**



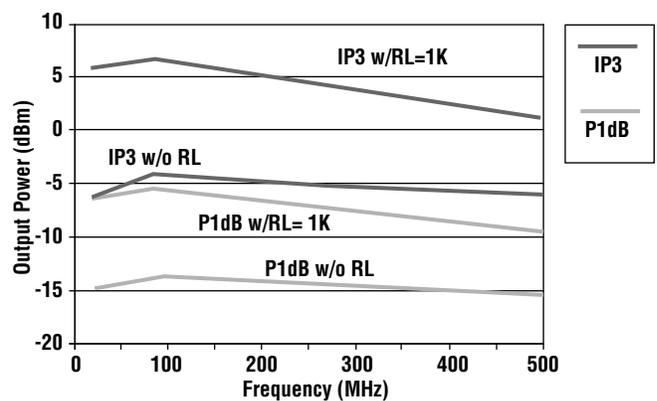
**P1dB and IP3 vs. Frequency vs. Temperature**



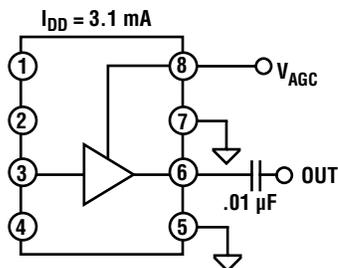
**AGC Transfer Curve vs. Temperature**



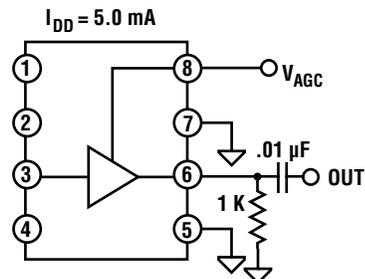
**P1dB and IP3 vs. Frequency vs. Load Resistor**



**Standard Output Circuit**



**Increased-Dynamic-Range Output Circuit**

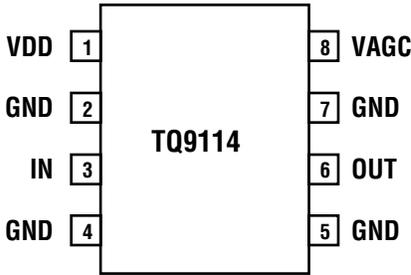


**Pin Descriptions**

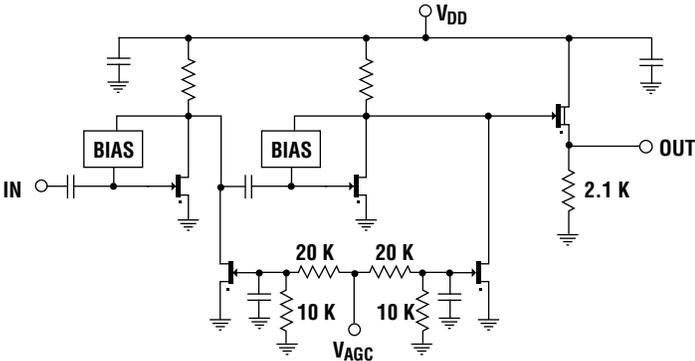
Pin Name	Pin #	Description
V <sub>DD</sub>	1	+5 V Power Supply. Decouple with 0.01 uF within 0.25 inch of package.
IN	3	Input is DC-blocked. VSWR and gain may be improved with external impedance matching, if desired.
V <sub>AGC</sub>	8	Gain control input. 0 V = maximum gain, +5 V = minimum gain. Slope of gain vs. voltage transfer function can be decreased by the addition of a series resistance in the V <sub>AGC</sub> line. (See schematic.)
GND	2, 4, 5, 7	Ground connection. Keep physically short for stability and performance. Pins are internally connected.

Note: Refer to block diagram for pin location

**TQ9114 Pinout**



**Circuit Schematic**



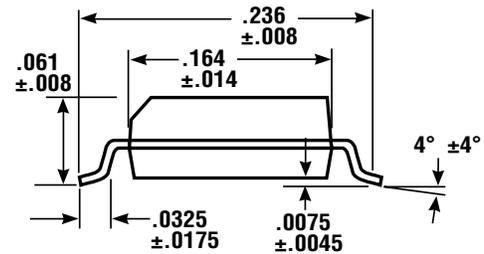
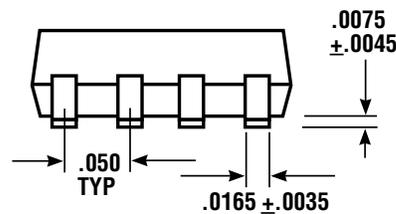
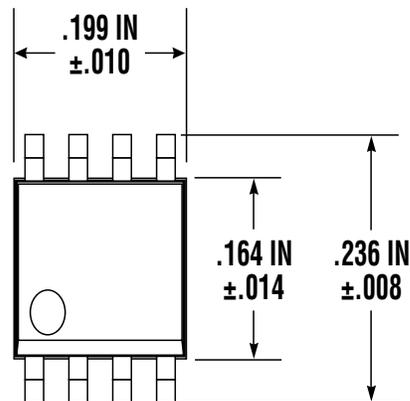
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## Absolute Maximum Ratings

Parameter	Min.	Typ.	Max.	Units
DC Power Supply			7	V
V <sub>AGC</sub>			7	V
Power Dissipation			70	mW
Input Power			+10	dBm
Storage Temperature	-55		+150	°C
Operating Temperature	-40		+85	°C

Note: ESD-sensitive device - Class 1

## SO-8 Plastic Package (N Suffix)



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